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Pulsed Discharge Over a Surface of a Liquid

Andrey F. Aleksandrov[*], Vladimir L. Bychkov[†], Vladimir A. Chernikov[‡], Aleksei P. Ershov[§], Sergei A. Kamenshikov[**] Dmitry N. Vaulin[♠]

Faculty of Physics, M.V .Lomonosov Moscow State University, Leninskie Gory , Moscow, 119991, *Russia, bychvl@orc.ru*

Results of experimental works with the electrode discharge are represented, namely: electrode pulsed discharge experiments realization over a fluid (tap water, distilled water and alcohol - water mixture) in the form of a surface ionization wave; experiments with two forms, complete and incomplete discharges, and three stages of the discharge development. Theoretical model of discharge electrical circuit is presented.

1.Introduction

In the present work we represent results of research continuation on electric gas discharges over liquids. We consider here pulsed discharges which our first investigations were described earlier in [1] **.** Here we describe results of experiments with different liquids such as tap and distilled water, and alcohol-water a mixtures which we used in order to clarify a nature of observed discharge phenomena over a surface of a liquid. Here we present a theoretical model of discharge electrical circuit.

2.Experiment

We represent results of undertaken experimental investigations of physical processes occurring at creation of a pulsed discharge over a surface of a liquid, for which we used usual tap water, distilled water, diluted alcohol, kerosene, and machine oil. Experiments were carried out with a help of two installations. A scheme of the first is represented in the Report for the 4-th stage of the present Project and a scheme of the second one is represented in Fig.1.

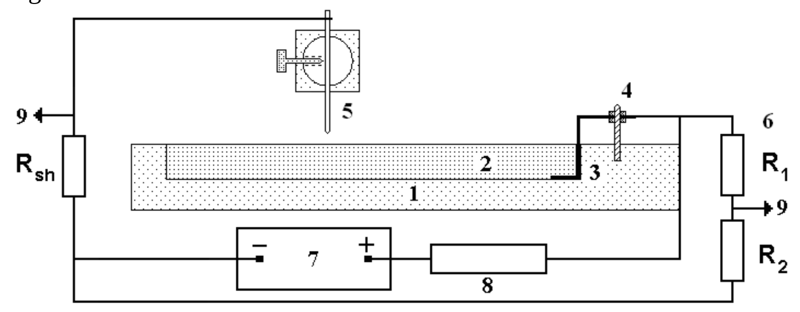


Figure 1. A scheme of the installation.

An investigating liquid was poured into a cavity (2), cut in unbroken piece of organic glass (1). The cavity sizes were 30×12 cm. A positive electrode- anode (5) was located directly over a liquid, it was made in a form of a sharpened steel rod 4 mm in a diameter. It was possible to vary a distance between it and a liquid in a range (1-20) mm. A flat negative electrode- cathode (3) was located straightly in the liquid. It was connected with a power source through an additional bar (4) . Water was a second electrode at initial linear breakdown.

A pulsed modulator (7) was applied as a feeding source of an electric scheme. It allowed to obtain pulsed with the duration from 10 μs to 1 ms. A power source's outlet voltage in a pulse was varied from 7 to 25 kV with a step

[*] Head of Chair
[†] Leading researcher
[‡] Associated Professor
[§] Associated Professor
[**],[♠] Post graduate students

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